

MANAGING THE COSTS OF GROWTH



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KEY POINTS

- *On the one hand, growth is a sign of prosperity and can help drive economic activity; on the other hand, a growing population brings with it new infrastructure costs and demands on existing services.*
 - *Policies that seek to encourage high-density development as a means of reducing municipal infrastructure costs focus on a very narrow component of the costs of growth, and could actually lead to higher total housing costs.*
 - *It is only in the context of total construction, land, and operating-cost comparisons that policy-makers and citizens can meaningfully understand the true costs of growth and make informed decisions.*
 - *The key is to charge the growth related infrastructure, operational and life cycle costs to the appropriate benefiting areas. This enables Calgarians to make housing and occupancy choices that minimize their costs and reduces or eliminates the tax-supported infrastructure costs that would accrue to the City.*
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*WHEN ACCOUNTING FOR TOTAL
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UNDERSTANDING AND MANAGING GROWTH-RELATED INFRASTRUCTURE COSTS

Managing growth and development within a city can be challenging. On the one hand, growth is a sign of prosperity and can help drive economic activity; on the other hand, a growing population brings with it new infrastructure costs and demands on existing services.

Municipalities that accommodate growth without sufficient compensation for the costs create structural funding gaps that can only be closed through other means of financing.

Municipalities generally apply both economic and planning policies to managing growth-related costs. Planning policy has tended to focus on encouraging smart growth

development (high-density, mixed-use, transit-oriented development) in both new and existing communities. Economic policy can be used to address the core market failures associated with development and to encourage residents to make informed decisions about where to live, work and commute based on user pays.

This paper undertakes a review of the planning and economic literature to compare infrastructure costs in new versus developed communities and by density of development, and it identifies strategies for managing growth and applies the findings in a Calgary context.

KEY FINDINGS

1. INFRASTRUCTURE COSTS BY TYPE OF DEVELOPMENT

Overall, initial infrastructure costs in low-density new developments tend to be higher per unit than they are in smart growth developments, largely because the costs are spread over more units and non-residential uses. However, in smart growth communities, the costs per square foot are higher, as higher density development involves higher construction costs.

The higher per unit costs of lower density growth are attributable to the need to build longer linear forms of infrastructure (roads, storm sewers, water and wastewater pipe), whereas the population-based costs (police, fire, parks and recreation, water and wastewater treatment) are comparable for all residential built forms. Although costs are slightly lower per unit in higher density scenarios, interestingly, life cycle infrastructure costs are comparable for both smart growth and low-density development.

The literature and public discussions of infrastructure costs tend to overlook the construction and land costs of different built forms. All things being equal, construction costs for higher density development are more per square foot. It is only in the context of total construction, land- and operating-cost comparisons

that policy-makers and citizens can meaningfully understand the true costs of growth and make informed decisions accordingly. According to the City of Calgary, the Canada Mortgage and Housing Corporation (CMHC) and private sector cost models, when accounting for total construction, infrastructure, land and 60-year life cycle costs by built form – and controlling for occupancy levels – single-family homes are the lowest cost form of development in Calgary. This is largely the result of lower construction costs per square foot and the economies of scale in their occupancy (2.91 persons per unit in single-family versus 1.81 persons per unit in multi-family). These savings more than offset higher single-family infrastructure, operating and life cycle costs per unit relative to other built forms.

The implication is that planning policies that seek to encourage high-density development as a means of reducing municipal infrastructure costs focus on a very narrow component of the costs of growth, and they could actually lead to higher total housing costs (including unit and infrastructure costs) depending on the housing and occupancy preferences of Calgarians. It is in the context of total construction and operating-cost comparisons that policy-makers and citizens can meaningfully understand the true costs of growth and make informed decisions accordingly.

APPROACHES TO MANAGING GROWTH- RELATED COSTS

A. PLANNING POLICY

Planning policies generally focus on achieving smart growth objectives in new and existing communities.

SMART GROWTH AND EXISTING COMMUNITIES

Policies that promote smart growth in existing communities generally have less than stellar success. Key obstacles include complex approval and zoning regulations, the need for community support, difficulties securing financing and challenges in terms of assembling land parcels. Perhaps the biggest problem is resident opposition, as densification has the potential to increase congestion, reduce green space and increase stress on existing infrastructure. Smart growth policies can also lead to higher housing costs and create overall affordability difficulties for the community. Regulatory and zoning reforms are critical for helping to alleviate these challenges and achieve smart growth objectives.

SMART GROWTH AND NEW COMMUNITIES

Policies that promote smart growth in new communities will help alleviate the need for future intensification. While smart growth policies are likely to improve density of development and mobility choice

within communities, in the absence of efficient pricing for transportation infrastructure, the increased use of public transit and work-home collocation objectives of smart growth are not likely to be successful. Smart growth policies also have the potential to alienate key segments of the population and could drive growth to the fringes of the municipality, creating adverse spillover effects.

B. ECONOMIC POLICY

As an alternative (or complement) to planning regulation, economic policy seeks to address the key market failures of growth: failure to ensure that new development pays for the infrastructure costs of growth, failure to account for the social costs of congestion and failure to account for the benefits of open space.

PAYING FOR THE COSTS OF DEVELOPMENT

New development imposes costs on a municipality in terms of initial capital costs, operating, maintenance and life cycle infrastructure costs. Good economic policy ensures that the initial capital costs are borne by developers through marginal cost pricing while households or communities that benefit pay the ongoing operating and life cycle costs through differential tax rates, user fees and/or levies.

PAYING FOR THE COSTS OF ROADS

Ideally, roads should be user pay. In the absence of tolling authorities, a second-best approach would be to

assign the ongoing operation and life cycle costs to the communities that benefit through differential taxes in proportions similar to development levy formulas.

PAYING FOR THE COSTS OF TRANSIT

The most-direct beneficiaries of transit are the users of the service. Fares are generally average-cost based, but they should be based on distance travelled and time of use in order to discourage urban sprawl and to encourage transit use for short trips. Zone and peak-time pricing could effectively accomplish these objectives. To the extent that external benefits arise through a reduction in pollution and congestion costs, some subsidization is justified, particularly if funded via a roads-based charge such as a gasoline tax.

PAYING FOR THE COSTS OF OPEN SPACE

When cities grow outward, developers often purchase land used for agricultural purposes. This may result in the loss of community access to open space. Municipalities can address this by establishing green-space requirements in new developments as well as earmarking sensitive areas for environmental protection and use.

*AS AN ALTERNATIVE (OR
COMPLEMENT) TO PLANNING
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FAILURE TO ENSURE THAT NEW
DEVELOPMENT PAYS FOR THE
INFRASTRUCTURE COSTS OF
GROWTH, FAILURE TO ACCOUNT
FOR THE SOCIAL COSTS OF
CONGESTION AND FAILURE TO
ACCOUNT FOR THE BENEFITS OF
OPEN SPACE.*

2. APPLYING THE RESEARCH IN A CALGARY CONTEXT

A. PLANNING POLICY

In 2009, the City of Calgary adopted a new Municipal Development Plan (MDP) to guide growth and development in the City. This plan seeks to encourage a more intensified form of urban development and has as its target the accommodation of a 33 per cent population growth in developed areas over the next 30 years. As a short-term goal, the City expects to accommodate an additional 28,000 people in existing communities by 2019. However, from 2002 to 2012, Calgary experienced a net loss of approximately 3,000 residents from existing communities to the suburbs.

The City is also developing a strategic framework for growth and change to help prioritize and sequence growth to specific targeted areas city wide. While the framework is thorough, applying this approach in combination with ambitious development targets in existing communities (and the absence of major zoning or regulatory reforms to facilitate redevelopment) will likely have a cascading effect in terms of constraining development in the city.

CALGARY CITY COUNCIL AND MUNICIPAL DECISION-MAKERS SHOULD FOLLOW THESE RECOMMENDATIONS:

1. Revisit the City's short to medium-term intensification targets for existing communities in the MDP, with a rebalance of population growth in new and existing communities informed by the total construction, land

and infrastructure costs associated with various built forms and occupancy counts per unit. This will enable a more gradual approach to development within the City, minimize potential spillover effects, enhance total economic housing benefits for Calgarians and avoid unnecessarily eroding housing affordability through excessive regulatory and time constraints;

2. Streamline regulatory and zoning processes for developments in existing communities, with a focus on permitting higher density development in existing low-density neighbourhoods;
3. Invest significant staff time and resources in implementing the strategic framework for growth and change, as both the literature and experience in Calgary have demonstrated a need for partnership with industry and a joint commitment to ensuring that such projects are a success;
4. Introduce an affordability and diversity of housing form sensitivity metric into the strategic framework for growth and change informed by total construction, land and infrastructure costs per person to ensure that the framework is not inadvertently selecting more-expensive, homogeneous developments or distorting the market.

This modified planning policy approach would help garner greater public support for development initiatives in existing communities, provide the City with greater flexibility to adjust its policies as needed, provide time for community groups and associations to align their community plans with the MDP and enable the development community to innovate and adjust their business models accordingly.

PLANNING POLICY RECOMMENDATIONS

<div> <div>LESS AMBITIOUS REFORM</div> <div>MORE AMBITIOUS REFORM</div> </div>	POLICY	CURRENT STATUS	DESCRIPTION	BENEFIT
	Introduce an affordability and diversity of housing form sensitivity metric into the strategic framework for growth and change, informed by total construction, land and infrastructure costs per unit	Not included in the framework	Need to ensure the framework is responsive to market demand and offers a diversity of housing choices and price points based on the actual costs of growth and development in order to maximize economic welfare	Sensitivity metrics help policy-makers monitor the impact of their decisions and make adjustments over time.
	Invest significant staff time and resources in the initial implementation of the strategic framework for growth and change	Not currently contemplated	Both the literature and experience in Calgary have demonstrated a need for partnership with industry and joint commitment in ensuring such projects are a success	Investing substantial focus and resources to implement the strategic framework for growth and change enables continuous learning and adjustments to ensure projects are a success without adversely affecting stakeholders. The lessons learned can be applied to future projects.
	Revisit the City's short- to medium-term development targets for existing communities in the MDP, with a more gradual approach toward the intensification of existing communities, informed by the total construction, land and infrastructure costs	Target is to accommodate a 33 per cent population growth in developed areas over the next 30 years	Targeting development in existing communities is a difficult approach to managing growth. Complex regulation, the need for community support, difficulties securing financing and challenges in terms of assembling land parcels are all at play.	A more gradual approach to development within the city helps ensure that citizens, businesses and the public sector have time to adjust their business practices and lifestyle choices. This approach will also minimize spillover effects, enhance total economic housing benefits for Calgarians and avoid unnecessarily eroding housing affordability through regulatory and time constraints.
	Streamline regulatory and zoning processes for developments in existing communities, with a focus on permitting higher density development in low-density neighbourhoods	City undertaking Transforming Planning initiative to strengthen internal approval processes. Zoning reforms in existing communities are not currently anticipated.	Complex regulation and zoning policies are key barriers to achieving development targets in existing communities.	Streamlining regulatory and zoning processes helps remove barriers to achieving development targets in existing communities.

B. ECONOMIC POLICY

The City has stated that the current approach to financing growth does not result in enough revenue to recover costs. To address this difficulty, the 2011 development levy agreement introduced a water and sanitary sewer levy for the first time since 1999, along with new levies for bus and pedestrian infrastructure. While Calgary development charges are now relatively comprehensive, aside from storm sewers, all levies are set on a city-wide basis using an average-cost approach, which essentially subsidizes costlier developments at the expense of more-affordable ones. A marginal cost price approach would send better market signals to prospective homebuyers in terms of the costs of growth-related infrastructure and the services they use. In addition, the City continues to fund infrastructure maintenance and life cycle costs of growth out of the general tax base as opposed to collecting them from the benefiting areas through tools such as special taxes, local improvement levies or differential residential tax rates.

CALGARY CITY COUNCIL AND MUNICIPAL DECISION-MAKERS SHOULD ALSO FOLLOW THESE RECOMMENDATIONS:

5. Adopt a marginal cost approach to development levies (as opposed to an average-cost approach) to ensure that new development in each community pays the actual infrastructure costs incurred. This should apply to new and existing communities. This approach can be achieved through, for example, the use of catchment boundaries for water, sanitary, storm and transportation infrastructure. The City should target this change in time for the next
- development levy negotiation with the industry in 2015;
6. Calculate maintenance, operating and life cycle infrastructure costs associated with new growth (roads, recreation, police, fire, EMS) and assign these costs to the residential units or communities that benefit (through various tools such as a special tax, a local improvement levy or differential residential-tax rates) using a marginal cost approach. This approach should also apply to utility fees. Accounting for the true cost of development enables Calgarians to make housing and occupancy choices that minimize their own costs and reduce or eliminate the tax-supported infrastructure costs that would accrue to the City;
7. Reduce the use of planning policies to regulate density in favour of the total construction, land and infrastructure cost approach for managing growth. This will lead to a more-efficient, market-based approach to growth management and will better enable Calgarians to make informed housing choice and occupancy decisions based on total costs, and it will reduce overall costs for the City;
8. Adopt different prices for transit use based on distance travelled, zones and peak use as opposed to the current flat-fee structure. This will help ensure that consumers pay based on the marginal cost of providing the service, and it will reduce incentives for overuse; and
9. Phase in any tax burden shifts over a five- to 10-year period to ensure Calgarians have time to adjust their work, home and commuting decisions accordingly.

ECONOMIC POLICY RECOMMENDATIONS

	POLICY	CURRENT STATUS	DESCRIPTION	BENEFIT
<div> <div>LESS AMBITIOUS REFORM</div> <div>MORE AMBITIOUS REFORM</div> </div>	<i>Adopt a marginal cost approach to development levies in existing and new communities</i>	<i>City negotiates development levies based on average cost</i>	<i>Marginal cost pricing is efficient. Better directs growth based on cost</i>	<i>Ensures new development in each community pays the actual infrastructure costs incurred (as opposed to more-expensive developments being subsidized by lower cost developments)</i>
	<i>Calculate and assign infrastructure operating and life cycle costs to communities and households</i>	<i>Funded out of the general tax base</i>	<i>Primary principle is that beneficiaries of a service pay the cost. Avoids structural infrastructure deficits</i>	<i>Helps citizens make more-informed decisions about housing costs and choice based on the true cost of growth. Reduces or eliminates tax-supported infrastructure costs associated with growth</i>
	<i>Phase in any tax burden shifts over five to 10 years</i>	<i>N/A</i>	<i>Ensures stability for citizens and the City in terms of understanding tax obligations and revenue expectations</i>	<i>Ensures Calgarians have time to adjust their work, home and commuting decisions in the event their costs increase</i>
	<i>Adopt different prices for transit use based on distance travelled, zones and peak use</i>	<i>Applies a current flat-fee structure</i>	<i>Primary principle is that beneficiaries of a service pay the cost. Avoids over-consumption and use</i>	<i>Differential pricing helps ensure consumers pay based on the marginal cost of providing the service and reduces incentives for overuse.</i>
	<i>Reduce the use of planning policies to regulate density in favour of the total construction, land and infrastructure cost approach</i>	<i>Uses planning policy to regulate density in order to reduce growth costs</i>	<i>Municipal planning policies that mandate higher densities unnecessarily increase housing costs and reduce the total economic welfare of Calgarians</i>	<i>Accounting for the true cost of development enables Calgarians to make housing and occupancy choices that minimize their own costs and reduce or eliminate the tax-supported infrastructure costs that would accrue to the City.</i>

1. INTRODUCTION

Managing growth and development within a city can be challenging. On the one hand, growth is a sign of prosperity and can help drive economic activity. On the other hand, a growing population brings with it new infrastructure costs and demands on existing services. Municipalities that accommodate growth without sufficient compensation for the incremental costs run the risk of creating structural funding gaps that can only be closed through other means of financing. Often, municipalities will subsidize this growth at the expense of existing taxpayers.

Municipalities generally apply both economic and planning policies to managing growth-related costs. Planning policy tends to focus on encouraging smart growth development (high-density, mixed-use, transit-oriented development) in new and existing communities to minimize growth-related costs. Although this approach can be helpful in setting the overall direction for the desired spatial design of a municipality, it is limited in terms of its effect on growth management due to its inability to direct market dynamics and consumer demand.

A complementary and, perhaps, more effective approach to encouraging efficient growth and development is economic policy. This approach helps address the core market failures associated with expansive development and encourages residents to make informed decisions about where to live, work and commute based on cost of use.

This paper undertakes a review of the planning and economic literature to compare infrastructure

costs and to identify approaches and best practices for managing growth, and it applies the findings to Calgary, with recommendations for change based on the Overton Window approach.¹ Section 1 undertakes a review of the comparisons of infrastructure costs in new and developed communities; section 2 compares the regulatory and economic approaches for managing growth in new and existing communities; and section 3 applies the findings to Calgary and makes recommendations for change.

2. INFRASTRUCTURE COSTS IN NEW AND DEVELOPED COMMUNITIES

The infrastructure costs associated with growth generally consist of local roads within new developments; expansion of arterial roads servicing the community; new transit infrastructure (bus stops, train stations, buses); water and wastewater distribution and facilities; storm sewers; new police, fire and EMS stations; neighbourhood parks and pathways; recreation facilities; libraries; planning and regulation; and social service and administrative supports (City of Calgary 2005:45 Financing Growth).

In addition to building the infrastructure, which represents a one-time cost, there are also the ongoing operating and life cycle costs to consider. Operating costs refer to the expenditures required to keep the infrastructure running, and life cycle costs are the maintenance, renewal and rehabilitation costs associated with the useful life of the asset (Vander Ploeg and Brunnen 2003:25). These all need to be considered and accounted for in understanding the costs of managing growth.

infrastructure-costing tool, CMHC (2008:7) found that

2.1 COMPARING COSTS BY DENSITY IN NEW COMMUNITIES

New development in greenfield areas can be built to accommodate high- or low-density units. Each has a different infrastructure cost profile. The CMHC (1995) undertook a comparison of the infrastructure costs of a conventional suburban development versus a smart growth (high-density, mixed-use, transit-oriented) development. The smart growth plan had 71 per cent more dwelling units (units per hectare at 43 versus 22 for the suburban development), 20 per cent more recreation and open space and more than twice the amount of commercial land. The study found that initial capital costs per unit were 16 per cent lower (\$5,300 per unit) in the smart growth plan. These savings were largely attributed to the higher residential density that spread the costs over more units and the higher proportion of non-residential land in the area, which reduced the apportionment of total costs to the residential sector. The study also found that the smart growth plan generated life cycle cost savings of \$11,000 per unit over 75 years, or \$147 per unit annually.

While these findings indicate that the more-compact form of development results in lower per unit infrastructure costs, the challenge with this study is that it does not necessarily take into consideration infrastructure costs per square foot of development or the number of occupants in the community. These metrics would help provide more-objective measures of the relative costs of each form of development. Interestingly, the life cycle costs of smart growth development are comparable to those of suburban development, with savings of \$147 per unit annually in the smart growth model. Using a more recent life cycle

for most of the cost categories, the neo-traditional [smart growth] households are estimated to have a lower annual cost than the conventional development. Hard infrastructure and linear infrastructure costs [roads, water and wastewater facilities] show the highest degree of reduction, at 25 per cent less cost. On the other hand, the municipal costs—such as fire, police and waste management—that are more directly proportional to population, not density of development, are similar in both scenarios.

In a similar vein, the City of Calgary estimated the incremental infrastructure costs of accommodating an additional 1.3 million people over 60 years through a dispersed (as opposed to densified) growth pattern at 11.2 billion city wide, or \$145 per new resident per year (City of Calgary 2008:ii). Total operating costs were much more comparable, with a total net difference of \$130-million over 60 years, or \$1.67 per person per year.

The most significant capital costs were attributed to roads, which would require more length and use in the dispersed scenario as well as higher maintenance and reinvestment costs (City of Calgary 2009:ii). For water and wastewater systems, more pipe would be needed to service more development; however, treatment facility costs (new water and sewer plants) would be similar in both scenarios, as these costs are population, not density, based. Similarly, fire service costs would be lower due to less need for new stations, but engine and personnel costs would be similar, while police, parks and recreation costs would be comparable.

Generally, the higher per unit costs of lower density growth are attributable to the need to build longer linear forms of infrastructure (roads, storm sewers and water and

wastewater pipe), whereas the population-based costs (police, fire, parks and recreation, water and wastewater treatment) are comparable. Once the initial infrastructure costs are incurred, the operating, maintenance and life cycle costs per unit are higher for lower density development, but they are comparable.

2.2 COMPARING COSTS IN NEW AND EXISTING COMMUNITIES

When comparing development costs in new versus existing communities, the infrastructure cost profile is very different. In new communities, all of the initial capital costs needed to service a community (roads, water and wastewater pipe and facilities, sidewalks, etc.) would be required. For existing communities, not all of these new infrastructure assets are necessarily needed. Because some of the infrastructure to accommodate growth in existing communities may already be in place, the new infrastructure construction costs would likely be lower at the outset.

However, there may be some additional investments needed in existing communities. Water and wastewater facilities and distribution lines could require additional upgrades to accommodate higher population densities (City of Calgary 2011a:9). There is also an incremental demand on transportation infrastructure, police and fire services, parks and recreation and social services associated with densification, but these population-based costs are likely comparable to those that would be incurred in new development.

Construction costs in existing communities, however, tend to be higher than in greenfield areas, as crews need to operate within the built environment, which

is more complex, regulatory burdensome and has a narrower margin for error than does a greenfield setting. Some studies suggest that redevelopment construction costs can be as much as 25 per cent higher than in greenfield areas for comparable units (Urbis 2011).

Overall, it is difficult to determine precisely the extent to which infrastructure costs differ in new versus existing communities. According to the City of Calgary (2013a:6):

Capital costs of road and transit construction depend on the size of a community and the distance to various destinations such as employment centres, shopping centres and the downtown core. Capital costs of waterworks and sanitary sewers depend on population, the total distance of transmission and distribution system, the cost of treatment facilities and the topography of the development area.

Thus, infrastructure cost comparisons in new versus existing communities will largely be community specific. Ewing (1997, as cited in Litman 2013:8) offers these general relationships:

- Costs are low in rural areas where households provide their own services.
- Costs increase in suburban areas where services are provided to dispersed development.
- Costs decline with clustering and as densities increase from low to moderate.
- Costs are lowest for infill redevelopment in areas

with adequate infrastructure capacity.

- Costs tend to increase at very high densities due to congestion and high land costs.

2.3 GROWTH, CONSTRUCTION AND LAND COSTS

An area often overlooked in the literature and public discussions of infrastructure costs is the construction costs of different built forms. All things being equal, higher density development costs more. High-density developments have different building requirements and material inputs such as elevators, sprinklers, basements and fire stairs/safety requirements that result in higher costs.

Altus (2013) publishes an annual handbook detailing construction costs in various municipalities across Canada. This handbook is widely used by builders and developers to estimate project costs for a given building type and year. When considering the costs per square foot of three comparable built forms – medium-quality single detached house, timber frame medium-quality townhouse and medium-quality condo/apartment in Calgary – average single-family home costs are the least expensive (\$145/sq. ft.), followed by townhomes (\$148/sq. ft.). Condo/apartments are the most expensive (\$245/sq. ft.).

This creates an interesting dynamic. When capital infrastructure, life cycle, maintenance and operating costs are lower per unit for smart growth residential development and construction costs per square foot are higher, there is the potential that smart

growth development actually raises the cost of home ownership, depending on the housing choice and occupancy preferences of Calgarians.

Approaching growth management issues based on the total construction costs per unit makes good sense; after all, the total construction costs of a residential unit not only include the cost of building the residence, but also the cost of building the capital infrastructure as well as the operating, maintenance and replacement costs of both. Focusing on the public infrastructure component alone is only part of the equation. It is in the context of total construction and operating cost comparisons that policy-makers and citizens can meaningfully understand the true costs of growth and make informed decisions accordingly.

Table 1 estimates the construction and infrastructure costs of the three comparable built forms discussed previously. Average square footage per unit estimates are based on the 2013 Canadian Homebuilder Survey (2013: 11). Occupant rates (persons per unit) are based on average suburban single-family and multi-family numbers for Calgary in 2011 (City of Calgary 2013a:63). The infrastructure costs are calculated based on two scenarios: The CMHC infrastructure cost model compares infrastructure costs in smart growth communities versus traditional suburban development (1995) adjusted for inflation, and the City of Calgary Plan It Calgary model estimates costs associated with a dispersed and a compact form of development (2009)². Greenfield land prices are derived from recent sale prices in Calgary, using an average sale price of \$210,000 per acre (Avison and Young 2011:6). Land per unit is assigned at 4,000 sq. ft. for single-

family homes, 1,000 sq. ft. for townhomes (including communal area proportions) and 550 sq. ft. for condo/apartments (based on four-story development and including communal area proportions).

Not surprisingly, average construction costs per unit are the highest for the single-family household at \$290,000 (2,000 sq. ft.). Condo/apartment unit costs are second highest at approximately \$270,000 (1,100 sq. ft.) and townhome units are the most affordable at \$206,500 (1,400 sq. ft.). When accounting for capital infrastructure, operating, land and 60-year life cycle costs, the disparity increases. Under the CMHC scenario, a single-family home is approximately \$68,000 more than a condo/apartment and nearly \$120,000 more than a townhouse. Under the Plan It Calgary scenario, the single family home is \$82,000 more than a condo/apartment and \$142,000 more than a townhome.

That said, dwelling units alone do not account for population growth. Single-family homes in Calgary have higher occupants per unit relative to townhomes and condo/apartments. According to the City of Calgary (2013a:63):

In 2011 there was an average of 2.88 people per single-family dwelling unit, while each multi-family dwelling unit averaged 1.81 people. Also, as the newer suburbs have a higher proportion of young families, occupancy is higher there than in the developed areas. Overall, the new suburbs have an occupancy rate of 2.91 people per unit.

Based on current occupancy trends, accommodating more people in higher density developments would require more units:

[We] expect occupancy to remain around this low level for at least the near term as more multi-family units with lower occupancy rates are built An increase in the community's density often requires a larger proportion of multi-residential dwellings, which typically accommodate fewer people. As such, the relationship between population and units is not proportionate (City of Calgary 2013a:63).

Given these dynamics, it is instructive to equalize construction costs by occupant rates, as this will give a more accurate picture of the costs of accommodating population growth. Under the CMHC model, when controlling for occupant counts, a 2,000-square-foot home is approximately \$75,000 cheaper (including construction, infrastructure, land and 60-year operating and life cycle costs) than a 1,100 square foot condo/apartment and \$41,000 cheaper than a 1,400-square-foot townhouse. Under the Plan It Calgary model, a 2,000-square-foot single-family home is \$35,000 cheaper than a 1,100-square-foot condo/apartment and \$2,000 cheaper than a 1,400-square-foot townhouse.

These findings suggest that when accounting for total construction, infrastructure, operating, land and life cycle costs by built form – and controlling for occupancy levels – single-family homes are the least expensive form of development. This is largely the result of lower construction costs per square foot and

TABLE 1: COMPARING CONSTRUCTION, INFRASTRUCTURE AND LAND COSTS BY BUILT FORM IN CALGARY

Built Form	Square Footage	Construction Costs per Square Foot	Construction Costs per Unit	Capital, Operating and Life Cycle Infrastructure Costs (60 years) per Unit	Greenfield Land Price per Unit	Construction, Capital Infrastructure, Operating Life Cycle and Land Costs per Unit	Number of Occupants	Unit Construction, Capital Infrastructure, Operating Life Cycle and Land Costs per Occupant	Unit Construction, Capital Infrastructure, Operating Life Cycle and Land Costs per Square Foot
CMHC Method									
Medium-quality Single Detached House	2,000	\$145	\$290,000	\$342,383	\$19,248	\$494,192	2.91	\$176,452	\$257
Timber Frame Medium-quality Townhouse	1,400	\$148	\$206,500	\$250,850	\$4,821	\$389,350	1.81	\$217,774	\$282
Medium-quality Condo/Apartment	1,100	\$245	\$269,500	\$313,850	\$2,652	\$452,350	1.81	\$251,382	\$414
Plan It Calgary Method									
Medium-quality Single Detached House	2,000	\$145	\$290,000	\$366,431	\$19,248	\$368,624	2.91	\$133,302	\$194
Timber Frame Medium-quality Townhouse	1,400	\$148	\$206,500	\$238,941	\$4,821	\$240,138	1.81	\$135,337	\$177
Medium-quality Condo/Apartment	1,100	\$245	\$269,500	\$301,941	\$2,652	\$303,138	1.81	\$168,945	\$278

Source: Altus (2013), CMHC (1995), City of Calgary (2009), City of Calgary (2013a)

economies of scale in their occupancy (whereby more people are accommodated per unit). These savings more than offset their higher total infrastructure, land, operating and life cycle costs relative to other built forms.

2.4 SUMMARY OF INFRASTRUCTURE COST FINDINGS

Overall, initial infrastructure costs in low-density new developments tend to be higher per unit than they are for higher density developments, largely because the costs are spread over more units and non-residential uses. However, the costs per square foot are also higher, as higher density development involves higher construction costs. Interestingly, life cycle infrastructure costs are comparable for both types of development, although they are slightly lower per unit in higher density scenarios.

When accounting for total construction costs (including capital infrastructure, operating, maintenance and life cycle costs), land costs and number of occupants, single-family homes are the least expensive form of development, as they offer economies of scale in their ability to accommodate more occupants than other built forms do. For local governments to make informed public policy choices about the costs of growth, these costs need to be considered together as the total cost of built forms.

In setting growth management policy and assigning costs, local governments are encouraged to attribute the capital infrastructure, operating and life cycle costs to the benefiting residential unit and account for

occupancy levels by unit type. This approach would enable Calgarians to make housing and occupancy choices that minimize their own costs and reduce or eliminate the tax-supported infrastructure costs associated with growth that would accrue to the City.

3. APPROACHES FOR MANAGING GROWTH-RELATED COSTS

Understanding infrastructure costs is the first step to understanding how best to manage growth-related costs. In order to manage these costs, local governments have two general mechanisms available: planning policy and economic policy. This section compares these separate approaches to managing growth-related costs in existing and new communities and their respective strengths and weaknesses.

3.1 PLANNING POLICY

Planning policy, in the form of zoning requirements, is generally the preferred tool for municipalities for managing growth. Through smart growth policies, zoning is utilized to manage long-term infrastructure costs by encouraging high-density, mixed-commercial and residential-use communities that are oriented around transit nodes. This is achieved through tools such as density minimums and smart growth design requirements in new developments, limitations on the amount of new greenfield developments available and pro-intensification policies in existing communities.

3.1.1 SMART GROWTH IN EXISTING COMMUNITIES

The intensification of existing communities has been a key objective identified by policy-makers and planners to manage growth; however, intensification policies have been met with less than stellar success. In a review

of the empirical literature on densification and infill development, McConnell and Wiley (2010:26) conclude:

[T]here is not strong evidence that policies implemented to promote infill, such as Urban Growth Boundaries and Priority Funding Areas, have worked. The combination of local government control over land use, economic costs, household preferences for housing types, and neighborhood opposition, presents formidable obstacles to any such policy.

A review of the experience in Portland, Oregon, which has imposed an urban growth boundary, suggests that density did not necessarily increase in the community relative to other cities, and “growth in the Portland area may have been pushed into other adjacent low-density areas that were not subject to the restrictions” (McConnell and Wiley 2010:5).

The CMHC (2005a) published a report card on smart growth in Canada and concluded, “[T]here is a large gap between the stated growth management policies found in the planning documents of the six study regions and accomplishments on the ground. While major progress has been made in terms of language and policy goals, performance is lagging behind considerably.”

Key obstacles to implementing intensification include urban area permitting and approval processes that require multiple hearings and strong community influence in the process; complex or stringent building and zoning requirements that increase the costs of development; a lack of community support;

different financial and risk profiles of intensification development; and challenges in terms of assembling land parcels for development (McConnell and Wiley 2010:5, Farris 2001).

Perhaps the biggest challenge to intensification is resident opposition. Densification has the potential to increase congestion, reduce green space, increase stress on existing infrastructure and create more social issues in existing communities (Litman 2013:8, McConnell and Wiley 2010:5). In essence, the costs are localized while the benefits are regionalized, and some studies have even found that intensification can reduce the house prices of adjacent properties, depending on the nature of the development.

Indeed, in a study of mixed land uses on housing values, Song and Knaap (2004) find “housing prices increase with their proximity to—or with increasing amount of—public parks or neighborhood commercial land uses [H]ousing prices are higher in neighborhoods dominated by single-family residential land use” The authors also find, “[H]ousing prices tended to fall with proximity to multi-family residential units.”

Given that a home is the single-largest investment many families will make, it is natural for homeowners to want to protect their investment. In a discussion of the evolution of zoning, Fischel (2001:8) asserts, “Among its most prominent advantages was protection of home values, especially in the suburbs, because zoning forestalled the threat of apartments and commercial and industrial uses from settling in the neighborhood.” From a developer perspective, zoning was “founded on the need to induce homeowners to invest their savings in a large, undiversified asset” that could not be insured

for equity losses (Fischel 2001:11).

These factors suggest that there is a long-standing, deep-rooted interest in protecting the value of the investments made by homeowners, and the existing zoning framework was conceived to achieve this objective. Consequently, efforts to promote smart growth in existing communities are effectively seeking to undermine what property owners have sought to achieve through decades of zoning practice. This puts pro-intensification policies at a significant disadvantage.

Urban intensification is also complicated. Unlike greenfield development projects, prospective infill properties tend to vary, with different attributes, development potential, obligations and requirements. Properties may have environmental remediation requirements that need to be addressed. Existing community plans may not align with the development potential of prospective properties. Design standards may be more stringent to account for local form and character concerns. Municipal planners may be challenged to apply a consistent decision-making framework for the approval of infill developments – particularly those that are innovative or controversial. CMHC (2005b, 2006) found environmental remediation costs, financial and general economic conditions, planning and regulatory approvals and neighbourhood opposition were key barriers to successful brownfield intensification in Canada.

From a process perspective, urban intensification projects tend to be more complex than new developments are. They involve the co-ordination of multiple municipal departments (planning, engineering, transit, roads, parks and recreation),

land uses (commercial, recreational, single- and multi-family residential), stakeholders (developers, residents, community groups, social agencies, businesses, municipal administrators) and plans and processes (community planning, zoning applications, building permits, community engagement).

These complexities generally lead to uncertainty in the development process, extending timelines and increasing costs. A number of studies have compared the relationship between land regulation, construction costs and housing affordability. Mayer and Sommerville (2000) find that “metro areas with more extensive regulation have up to 45 percent fewer [housing] starts” and that while “development or impact fees have relatively little impact on new construction ... regulations that lengthen the development process or otherwise constrain new development have larger and more significant effects.”

Saks (2005) found that “places with more regulation experience a 17 percent smaller expansion of the housing stock and almost double the increase in housing prices” when hit by a demand shock. Glaeser and Gyourko (2003:35) find that “measures of zoning strictness are highly correlated with high prices” – findings that were later validated by Sommerville in a report commissioned by CMHC (2005c:2).

These findings suggest that the role of urban intensification in achieving smart objectives tends to be limited and, in fact, has the potential to result in higher housing costs and to create overall affordability challenges for the municipality. Perhaps the ideal approach for incorporating urban intensification into municipal smart growth planning policy is best phrased

by Farris (2001:2):

The primary goal of smart growth advocates should be to encourage higher-density quality development at the metropolitan edge and exurbia while selectively choosing those relatively limited infill opportunities.

3.1.2 SMART GROWTH IN NEW COMMUNITIES

Municipalities are often encouraged to focus on strengthening smart growth principles in new communities. After all, policies that promote smart growth in new communities will alleviate the need for subsequent intensification of existing communities in the long run. However, applying smart growth practices to new communities represents a substantial shift in consumer preferences and business practices that may not be realistic.

In terms of where to live, increased mobility has made quality of life one of the top priorities for people when choosing their location, and it is often a higher priority than commuting times or proximity to work. As Fischel (2001:21) asserts, “[T]he local school’s test scores are a larger determinant of home values than access to jobs.” In a recent comparison of smart growth and conventional communities in Canada, CMHC (2013) found that while there was increased walking and bike use within smart growth communities compared with traditional suburban development, there was no substantial difference in the use of public transit for longer trips. The smart growth communities had 17 per cent fewer jobs within a 5 km radius. These findings suggest that the smart growth objectives of work-home

collocation and greater transit use may be difficult to achieve.

From an employment perspective, while job suburbanization has been observed to some extent with population disbursement, much of it is the result of the increased accessibility of businesses to less-expensive land due to increased transportation accessibility (Fischel 2001:19). These types of jobs tend to be location specific (located in industrial and logistics parks) and generally not in areas accommodative for residential uses. However, there is evidence that some jobs (such as restaurant, retail and professional services) do follow population growth (Brueckner 2000:163, Cervero 2001:5), especially when coupled with investments in transportation nodes that help encourage sub-centre development (Cervero 2001:11). These jobs could potentially enable work-home collocation objectives. However, as Fischel (2001:20) notes, “In the multi-nucleated metropolis, urban jobs are almost equally far from any given suburb,” and unless transportation accessibility becomes constrained, residents are unlikely to prioritize work-home collocation in the communities they choose.

In terms of transit use, more transportation accessibility has increased the disbursement of people and businesses across cities. In the absence of transportation accessibility constraints, creating an economically viable public transit system that meets the needs of residents (with increasingly complex trips) in a manner more efficient than the automobile is a significant challenge.

Another consumer-related challenge of smart growth relates to the preferences of the population. CMHC (2013) found that traditional developments attracted an older cohort with more adults with children, which

is consistent with the City of Calgary’s occupancy rates (2.91 persons per unit in new single-family homes compared to 1.81 in multi-family units) (City of Calgary 2013a:63). In regions where there are location choices and a lack of alignment of development policies across neighbouring municipalities, smart growth policies for new communities may drive these prospective homeowners to the urban fringes or to neighbouring municipalities in pursuit of the quality of life they desire. This effect is exacerbated when considering affordability: While the construction and development costs per unit are lower for smart growth properties, the costs per person and per square foot are higher. Thus, under smart growth, not only will prospective homeowners be getting a smaller home, they will be paying more for it per square foot. These conditions have the potential to create an unsustainable development pattern within the region over the long run, with free-rider costs imposed on the central municipality.

Finally, there is the need for developers and administrators to adjust to new business practices because of smart growth policies in new communities. Smart growth represents a new business model for many traditional suburban developers and requires significant co-ordination, risk sharing and alignment on the part of the municipality (Cervero 2001:12, Calgary Chamber of Commerce 2008:49). If new developments have higher densities, smaller roads, less parking and are dependent upon public transit for mobility, then the supporting infrastructure and services need to be in place near the time that residents move in. This creates complications, uncertainty and additional risk (over and above the uncertainty over the demand for the new product) and needs effective management to ensure the viability of smart growth strategies.

PERHAPS THE BIGGEST CHALLENGE TO INTENSIFICATION IS RESIDENT OPPOSITION. DENSIFICATION HAS THE POTENTIAL TO INCREASE CONGESTION, REDUCE GREEN SPACE, INCREASE STRESS ON EXISTING INFRASTRUCTURE AND CREATE MORE SOCIAL ISSUES IN EXISTING COMMUNITIES.

3.2 ECONOMIC POLICY

Economic policy is the second tool available to municipalities for managing growth-related costs and is often used in concert with regulation. From an economic perspective, excessive or unsustainable growth is largely the result of three market failures: failure to ensure new development pays for the infrastructure costs of growth, failure to account for the social costs of congestion and failure to account for the benefits of open space (Brueckner 2000). Well-designed economic policies and approaches can address these challenges.

3.2.1 PAYING FOR THE COSTS OF DEVELOPMENT

Failure to account for the true infrastructure costs of growth is perhaps the most significant and direct challenge for effectively managing growth and development. As discussed, these costs are best accounted for as part of the construction, operation and life cycle costs of the residential unit. The most common tool available to municipalities to help account for these costs is development cost levies or off-site levies. Developers pay these levies to compensate municipalities for the initial infrastructure costs of new development – in both greenfield and infill situations.

The concept of the development levy approach is founded upon the benefits-received principle, which seeks to ensure that those who benefit from the incremental infrastructure and services also pay the costs. This is widely applied by municipalities across Canada when it comes to development charges for new communities (CMHC 2010:6).

One of the problems with the development levy approach in Canada, however, is that fees tend to be standardized per unit of development and class of property (residential, commercial, industrial) regardless of the location of the development within the community (Kitchen 2006:28). While this is an administratively efficient approach, it is essentially average-cost pricing for development, which subsidizes relatively more-expensive developments at the expense of less-expensive ones.

A more efficient approach would be to charge development fees based on the actual marginal costs of the new infrastructure that is required in the community as opposed to average costs (Kitchen 2006:28, Slack 2006:16, Brueckner 2000:166). To account for different unit sizes and densities within communities, levies should be apportioned within developments based on marginal infrastructure costs per unit.

While the development cost levies are useful from a benefits perspective, they are able to capture only a narrow component of the overall costs of growth and development. As discussed, the ongoing operating, maintenance and life cycle costs of infrastructure must also be considered.

The failure to appropriately account for and price life cycle infrastructure costs has led to the infrastructure deficits confronting municipalities (Vander Ploeg and Brunnen 2003:28). These types of costs need to be invested on an ongoing basis to maintain and/or extend the useful life of municipal infrastructure assets. When maintenance is deferred, the useful life of the asset is shortened and rehabilitation and replacement costs arrive sooner.

The general operating and capital budgets of municipalities usually fund life cycle infrastructure costs; however, this approach is detrimental from a benefits perspective, as existing residents end up subsidizing new growth, and there are no price signals for understanding how much infrastructure to provide. In addition, an inability to fully acknowledge and account for these costs in the price of the residential unit sends distorted signals to both the market and the decision-makers. A more efficient social-welfare maximizing approach would be to charge these costs to the benefiting area and/or units as opposed to regulating built form densities and absorbing these costs through the general tax base.

The best way to price operating and life cycle costs is not through development levies (because the beneficiaries are long-term residents, not initial homebuyers) but rather through tax tools such as a special tax by-law, differential residential tax rates at a community level or a local improvement levy (which are all available to Alberta municipalities).

3.2.2 PAYING FOR THE COSTS OF TRANSPORTATION

The second market failure of urban growth is the failure to account for the true costs of transportation. Transportation accessibility is widely cited as a key contributing factor in the suburbanization and expansion of cities (Fischel 2001, Brueckner 2000, Litman 2013). As Cervero (2001:4) posits:

Transportation investments induce growth for one, and only one, reason: they improve accessibility. It is accessibility – the opportunity to reach places efficiently – that attracts new growth.

A market failure arises when the costs of the investments and the use of transportation infrastructure (construction, congestion, environmental impacts) are not paid for by the beneficiaries.

3.2.2.1 ROADS

Growth requires investment in both local community roads and arterial road networks. For local community road infrastructure, all of the benefits tend to accrue to the local homeowner, and a development cost charge for the initial investment is an equitable approach (City of Calgary 2005:39).

For arterial roads, the benefits can be divided into the option to use the road and the actual use of the road. The option to use component is linked to the property, and the initial costs (both the extensions and updates to the existing system) can be financed equitably through off-site development levies (City of Calgary 2005:40).

For the actual use and operating costs of the road, the ideal pricing tool is a user-based road toll (City of Calgary 2005:39, Kitchen 2006:76, Slack 2006:11). This is the most efficient way to ensure that beneficiaries (motorists) pay for the costs of the infrastructure they use. The key here is to ensure that the price is based on the actual costs of maintaining the roads, including life cycle costs, along with a pollution component for vehicle use (City of Calgary 2005:39). To account for congestion costs, differential pricing could be applied during peak periods. Many jurisdictions in Canada, the United States and overseas have experienced success with these electronic tolling technologies (Kitchen and Lindsey 2013:48).

In the absence of a road toll and similar to the approach discussed above, a second-best approach is to estimate the operating, maintenance and life cycle infrastructure costs of the road network and then apportion appropriate costs to the benefiting communities. This can be done through differential property taxes such as local improvement levies, differential residential tax rates or a special tax option similar to the way initial capital costs are paid through developer levies.

3.2.2.2 TRANSIT

Transit infrastructure is like that of roads. There is an option for use benefit that is tied to the property (especially for rail-based transit) as well as a user component. The option for use component is a localized one, with strong benefits linked to the properties in the immediate vicinity of the investment (Cervero 2001:5, Doherty 2005, Smith, Gihring and Litman 2009, Junge and Levinson 2012). This suggests that under a benefits-based approach, the initial infrastructure costs should be funded through levies on local benefiting properties. A number of studies have advocated for land-value capture approaches for financing transit, which would provide an incentive for more densified development in proximity to transit infrastructure (Smith, Gihring and Litman 2009, Junge and Levinson 2012).

From a use perspective, the most-direct beneficiaries of transit are the users and, correspondingly, user fees should represent a significant component of the costs (City of Calgary 2005:39, Kitchen and Lindsey 2012). Fares should also be based on distance travelled and time of use, as flat fares encourage urban sprawl and discourage transit use for short trips (Kitchen and Lindsey 2012:6). Zone and peak-time pricing could effectively accomplish these objectives.

Some suggest there are also external benefits to public transit such as a reduction in pollution and congestion costs, leading to lower infrastructure costs for road investments (City of Calgary 2005:40). Where road toll prices are in place, these externalities are accounted for. However, in the absence of tolls, some subsidization is justified, particularly if funded via a roads-based charge such as a gasoline tax (City of Calgary 2005:41). To the extent that transit provides a social benefit through universal access for lower income individuals, an income-based approach is the most effective method for achieving this objective.

3.2.3 PAYING FOR THE COSTS OF OPEN SPACE

The final market failure is the failure to account for the social value of open space. This failure arises when the community loses access to open space that has been valued for leisure by existing residents. Generally, when cities grow spatially, developers often purchase agricultural land. While some argue that urban development devours scarce agricultural land, it is important to bear in mind that this transaction involves a willing buyer and seller, whereby the value of the land is worth more in urban use. Where the productive value of the agricultural land is high, urban development is less spatially consuming (Brueckner 2000:164).

Accounting for the public value of open space, however, is a subjective exercise involving substantial discretion. Options available to municipalities include establishing green space requirements in new development as well as earmarking sensitive areas for environmental protection and recreation use such as in the case of Stanley Park in Vancouver or Fish Creek Park in Calgary.

3.3 SUMMARY

Managing growth-related costs is a complex task.

While land-use policies can play an important role in directing development, the limitations of this tool must be recognized. Policies that encourage smart growth design and densification are not likely to be met with substantial success on their own. These approaches, while well intended, generally involve high-level estimations and speculation in terms of overall targets and market demand and do not address the underlying economic dynamics of individual and business location and mobility decisions and the corresponding market failures at play.

While it is important for existing communities to prioritize intensification, the primary focus of planning policy cannot be to manage growth-related costs, as there are too many inertial factors at play. Highly regulated environments compromise housing affordability. For new communities, planning policies that seek to achieve smart growth objectives have the potential to be more effective, but they need to be developed in concert with effective financial tools.

The key is to focus on full-cost pricing for new infrastructure and ongoing operational and life cycle costs and assign these costs to the appropriate benefiting areas (in new and existing communities). This approach would lead to the lowest overall construction, infrastructure and life cycle costs for accommodating population growth. It ensures that the beneficiary pays the costs and that the tax base does not absorb them.

Because single-family housing offers the lowest total cost per occupant, planning policies that seek to encourage high-density development as a means

of reducing municipal infrastructure cost focus on a very narrow component of the costs of growth, and this actually leads to higher total housing costs through the oversupply of high-cost, high-density, low-occupancy units. These cost increases are in excess of the infrastructure and life cycle cost savings that would accrue to government in the absence of such policies (costs already funded through the tax base). Consequently, this type of policy approach ultimately decreases the total economic welfare of the citizens of Calgary.

Transportation pricing is perhaps the most important factor in managing growth-related costs. As Cervero (2001:3) notes, “[R]ising motorization is rooted in many factors beyond sprawl,” and much of the demand is linked to rising incomes and access to motorized vehicles (Brueckner 2000:169, Cervero 2001:3). Some studies found that smart growth actually leads to increased traffic congestion (Litman 2013:8, Cox 2000, Ewing and Cervero 2010). Consequently, addressing the challenges that arise with increased transportation mobility requires more than smart growth or anti-sprawl-related policies. It requires pricing. Perhaps Kitchen and Lindsey (2013:8) put it best: “Without efficient pricing of public transit and roads, users will not make appropriate decisions about how often to use it, where to live and work, and so on.”

4. HOW DOES CALGARY COMPARE AND WHAT ARE THE PRIORITIES FOR CHANGE?

The City of Calgary is a very active municipality in terms of its approach to managing the costs of growth. Fiscal sustainability is an increasing concern in the municipality, which has experienced substantial growth in recent years. In response, the City developed a new approach to growth management that prioritizes smart growth patterns of development in new and existing communities. The City also recently increased its growth-related development levies.

This section reviews the City of Calgary's planning and economic policies for managing growth-related costs in the context of the above reviewed literature and offers recommendations for strengthening the City's approach. The Overton Window approach is the basis for these recommendations.

4.1 CALGARY PLANNING POLICIES FOR MANAGING GROWTH-RELATED COSTS

In 2009, the City of Calgary adopted a new MDP to guide growth and development (City of Calgary 2009). This plan sought to encourage a more smart growth-oriented form of urban development, with a focus on high-density, mixed-use, transit-oriented development in new and existing communities. This plan is based on a long-term vision wherein the city will accommodate a 33 per cent population growth over the next 30 years in developed areas as well as 50 a per cent growth in developed areas over the next 60 to 70 years (City of Calgary 2013b:51).

The intent is to increase densities in existing and new communities and to intensify around strategic nodes and corridors to ensure efficient use of land and infrastructure. As part of this plan, the City has developed a strategic framework for growth and change that seeks to prioritize and sequence infrastructure investments in new and existing communities based on a combination of factors in order to achieve smart growth objectives (City of Calgary 2009:part 5).

The City should be commended for its well-intentioned and comprehensive approach to managing growth and development. This ambitious project is sure to provide helpful direction in guiding municipal growth and development over the long term. The challenge with the City's approach, however, is the complexity of the task before it. A number of intricate factors, many of which will be situation specific and guided by economic and behavioural fundamentals, drive growth and development decisions.

4.1.1 GROWTH IN EXISTING COMMUNITIES

Perhaps the biggest issue confronting the City's overall growth management approach is the focus on intensification as a major source of future development – 50 per cent of population growth over the next 60 to 70 years. For context, "Calgary has grown by 243,706 people since 2002, while the new suburbs have added 246,687 people" (City of Calgary 2013a:58). This is a net loss of approximately 3,000 residents from existing communities to the suburbs over this 10-year period. As a short-term goal, the City expects to accommodate an additional 28,000 people in existing communities by 2019 (City of Calgary 2013:a:54). This is a net increase of approximately 31,000 or 2,400 residents annually.

Recall that the use of planning policies to achieve intensification of existing communities is a limited tool that must overcome substantial inertial effects and has the potential to result in higher housing costs, create overall affordability challenges for the City and/or drive growth to the fringes of the region. In the absence of a focused approach, including streamlined planning processes, permitted use zoning and ongoing commitment and resources on the part of the municipality (usually in partnership with the private sector), these targets will be very difficult to achieve.

Moreover, alignment of existing community plans with the overarching MDP is generally needed for enlisting community support for achieving densification targets in existing communities. However, many of the community plans have not been updated since the adoption of the MDP and, as a result, there is uncertainty and the potential for unnecessary delays in the evaluation of development applications that seek to achieve intensification targets.

A more prudent and gradual planning approach to managing growth city wide would be for a more balanced approach to population growth in new and existing communities, in concert with reforming the planning and regulatory process to remove barriers to development and identify select existing communities for prioritization under the growth management framework. This prioritization needs to be informed by the true costs associated with various built forms, based on actual occupancy counts per unit.

4.1.2 PRIORITIZING AND SEQUENCING COMMUNITY DEVELOPMENT

Calgary City Council is in the process of finalizing criteria and performance metrics for the prioritization and sequencing infrastructure investment and development patterns as part of its strategic framework for growth and change. These criteria include the capacity of existing infrastructure, the community services in place, city-funded costs, access to transit, land supply, readiness to proceed (landowner and community support), contiguous growth, innovation and employment opportunities (City of Calgary 2012).

While the framework is thorough, some of these criteria (such as innovation) present significant discretion in their interpretation, which creates uncertainty for prospective developers in terms of bringing forward applications for development. Other criteria, such as access to transit and employment opportunities, have the potential to substantially narrow the market for new development to areas where land is already more expensive and would cater to a particular subset of the population.

The access to employment criterion seems particularly limiting, as collocation of residence and place of employment is very difficult to achieve in a dispersed metropolitan area with different sectors. Employment decisions are not necessarily up to the discretion of the employee and accounting for quality in job type is a subjective process. Areas with the greatest job to population densities in the city include the downtown, the east and the northeast (City of Calgary 2013a:84).

The downtown is already well developed and well serviced by transit and other transportation modes, while the east and the northeast have strong industrial components and employment centres that are dispersed and isolated from residential areas. Employment proximity is also not necessarily a desired attribute sought by homebuyers, given the accessibility of transportation options within the city, combined with a preference of quality of life in residential location decisions. Lower job to resident ratios in other quadrants of the city, such as the north central and west areas, demonstrate this.

Rather, the City is encouraged to focus on access to existing transportation infrastructure, nodes and corridors, which are already incorporated in the criteria under “community services in place.” This approach will ensure that residents are able to transport themselves to employment locations efficiently, and these are areas where future employment opportunities will tend to develop in response to population growth (Cervero 2001:5). However, to make this approach truly successful, Cervero (2001:12) asserts:

A number of pre conditions must usually exist if new transport facilities are to exert meaningful land use impacts. Foremost among these are: permissive and incentive zoning, ... the availability of nearby vacant or easy to assemble and developable parcels; support for land-use changes among local residents; a hospitable physical setting; complementary public improvements; ... and an absence of physical constraints.

While the strategic framework for growth and change

seeks to address many of these factors, it is unlikely that all of these factors will be in place at once for the majority of development opportunities in the city. This approach also requires substantial focus, involvement and resourcing by the municipality, which needs to be consistently committed in order for the strategic framework to be successful. In reviewing the City’s experience in building smart growth communities, the two most prominent and ground-breaking examples, McKenzie Towne and Garrison Woods, required strong partnership and co-ordination between the City and the developers:

Both the developer and the City incurred significant risk in the process, the developer provided a product that was unconventional for the market, and the City undertook efforts to create alternative engineering and design standards to ensure the success of the development. Design standards for Garrison Woods took 14 months, and a similar approach for the McKenzie Towne project took 12 months (Calgary Chamber of Commerce 2008:49).

In addition to these complexities, perhaps the biggest challenge with the City’s approach is the creation of a new strategic framework for growth and change in addition to setting ambitious intensification targets for existing communities relative to historical standards. Absent major zoning and regulatory reforms to facilitate redevelopment, this will likely have a cascading effect in terms of constraining development in the city.

Consequently, the City should proceed with caution in implementing the framework to ensure it is able to commit the necessary focus, resources and investments

to complement the private investment and make sure that the projects are successful. Lessons learned and continuous improvement could then be applied to future projects. Running scenario analyses on the affordability and diversity of housing form in prioritized developments would also be prudent to ensure that the municipality is not inadvertently selecting more-expensive and homogeneous developments through the framework.

4.1.3 PLANNING POLICY RECOMMENDATIONS

CALGARY CITY COUNCIL AND MUNICIPAL DECISION-MAKERS SHOULD FOLLOW THESE RECOMMENDATIONS:

1. Revisit the City's short- to medium-term intensification targets for existing communities in the MDP, with a rebalance of population growth in new and existing communities, informed by the total construction, land and infrastructure costs associated with various built forms and occupancy counts per unit. This will enable a more gradual approach to development within the city, minimize potential spillover effects, enhance total economic housing benefits for Calgarians and avoid unnecessarily eroding housing affordability through excessive regulatory and time constraints;
2. Streamline regulatory and zoning processes for developments in existing communities, with a focus on permitting higher density development in low-density neighbourhoods;
3. Invest significant staff time and resources in implementing the strategic framework for growth

and change, as the literature and experience in Calgary have demonstrated a need for partnership with industry and joint commitment in ensuring such projects are a success;

4. Introduce an affordability and diversity of housing form sensitivity metric into the strategic framework for growth and change, informed by total construction, land and infrastructure costs per person to ensure the framework is not inadvertently selecting more-expensive, homogeneous developments or distorting the market.

This modified planning policy approach would help garner greater public support for development initiatives in existing communities, provide the City with greater flexibility to adjust its policies as needed, provide time for community groups and associations to align their community plans with the MDP and enable the development community to innovate and adjust their business models accordingly.

PLANNING POLICY RECOMMENDATIONS

	POLICY	CURRENT STATUS	DESCRIPTION	BENEFIT
LESS AMBITIOUS REFORM	Introduce an affordability and diversity of housing form sensitivity metric into the strategic framework for growth and change, informed by total construction, land and infrastructure costs per unit	Not included in the framework	Need to ensure the framework is responsive to market demand and offers a diversity of housing choices and price points based on the actual costs of growth and development in order to maximize economic welfare	Sensitivity metrics help policy-makers monitor the impact of their decisions and make adjustments over time.
	Invest significant staff time and resources in the initial implementation of the strategic framework for growth and change	Not currently contemplated	Both the literature and experience in Calgary have demonstrated a need for partnership with industry and joint commitment in ensuring such projects are a success	Investing substantial focus and resources to implement the strategic framework for growth and change enables continuous learning and adjustments to ensure projects are a success without adversely affecting stakeholders. The lessons learned can be applied to future projects.
MORE AMBITIOUS REFORM	Revisit the City's short- to medium-term development targets for existing communities in the MDP, with a more gradual approach toward the intensification of existing communities, informed by the total construction, land and infrastructure costs	Target is to accommodate a 33 per cent population growth in developed areas over the next 30 years	Targeting development in existing communities is a difficult approach to managing growth. Complex regulation, the need for community support, difficulties securing financing and challenges in terms of assembling land parcels are all at play.	A more gradual approach to development within the city helps ensure that citizens, businesses and the public sector have time to adjust their business practices and lifestyle choices. This approach will also minimize spillover effects, enhance total economic housing benefits for Calgarians and avoid unnecessarily eroding housing affordability through regulatory and time constraints.
	Streamline regulatory and zoning processes for developments in existing communities, with a focus on permitting higher density development in low-density neighbourhoods	City undertaking Transforming Planning initiative to strengthen internal approval processes. Zoning reforms in existing communities are not currently anticipated.	Complex regulation and zoning policies are key barriers to achieving development targets in existing communities.	Streamlining regulatory and zoning processes helps remove barriers to achieving development targets in existing communities.

4.2 CALGARY ECONOMIC POLICIES FOR MANAGING GROWTH-RELATED COSTS

In recent years, the City found that the current approach to financing growth did not result in sufficient revenue to recover costs. According to the City of Calgary (2010:4):

Suburban growth at traditional densities in the range of four units per acre has been acknowledged as not completely paying for itself. The overall benefits realized by The City for this type of low density suburban development do not outweigh the initial and ongoing operational costs to The City.

Consequently, the City was challenged to reconcile this funding gap through changes to planning and growth-financing policies. The 2011 to 2015 development levy agreement negotiated between the City and the Urban Development Institute introduced a water and sanitary sewer levy for the first time since 1999, along with new levies for bus and pedestrian infrastructure (City of Calgary 2011b). Levies, fees and charges for new development in Calgary now include local roads, arterial roads, storm sewers, traffic signs, fire, EMS and police stations, recreation and library facilities, large buses, administration/inspection costs and water and wastewater facilities.

Increasingly, the City has been seeking to enhance the responsiveness of development agreements to the actual costs of servicing new communities and has, for example, created differential rates for storm sewers depending on the watershed area of the community. However, all other levies are set on a city-wide basis (City

of Calgary 2013b:11). As discussed, this average-cost pricing approach is inefficient and distorts the market for new development by subsidizing more-expensive developments at the expense of more-affordable ones. A marginal cost-price approach (for new and existing community development) would send better market signals to prospective homebuyers in terms of how the cost of growth relates to the infrastructure and services that they consume.

While the City's development levy approach is beneficial in terms of ensuring that new development pays for the infrastructure costs of development, "the City's funding problem in recent years was partly ... driven by the spread out growth pattern in Calgary and the way the municipality uses funding and financing tools available to it" (City of Calgary 2013b:1). In particular, the City continues to be challenged in terms of its approach to assigning the maintenance and life cycle infrastructure costs of growth to the beneficiaries. According to the City of Calgary (2013b:5):

While the largest components of the cost attributable to growth are the initial capital costs, new capital necessitates ongoing operating costs and eventual replacement costs. ... On an annual basis, lifecycle maintenance consistently costs more than operating costs in roads and utilities. By comparison, annual operating costs are higher than lifecycle maintenance costs in transit. Transit operating costs tend to increase with the number of hours of operation each year, which is determined by growth in the population as well as the geographic expansion of the city. As a result, when making growth related infrastructure investment decisions, The City of Calgary has to consider ongoing cost obligations required for new infrastructure.

As discussed, the operating maintenance and life cycle infrastructure costs associated with new development are best paid for by the beneficiaries. Specifically, these costs (along with initial infrastructure costs) need to be accounted for in the costs of construction of various housing unit built forms and assigned to the benefiting household or community.

For road-related infrastructure, in the absence of a road tolling authority, a second-best approach is to assign these costs to the benefiting area through a special tax levy, a local improvement levy or a differential residential tax rate for the area in proportions similar to the original capital levies. For water and wastewater utility services, incorporating depreciation and/or infrastructure replacement costs into the user fees will help ensure the long-term financial viability of the system in proportion to the costs of consumption.

For transit infrastructure, current fee structures are not responsive to costs of service or demand for use; rather, they are based on average pricing even the costs increase with distance (City of Calgary 2013:14). A more efficient approach would be to introduce differential pricing based on trip length, zones and peak periods. In terms of infrastructure, a very distinct property beneficiary pattern is associated with rail infrastructure, and the infrastructure replacements costs of all transit should be assigned to the benefiting area in a manner similar to other growth-related infrastructure.

Adopting these approaches will enable Calgarians to make informed choices about the costs of the various built forms they choose, balanced against the benefits, and lead to the most-efficient and cost-effective outcome for total infrastructure costs – ultimately maximizing

the total welfare of Calgary citizens and reducing or eliminating City-funded growth costs. This pricing approach reduces the need for planning regulation in managing growth-related costs, as it is ultimately more effective at managing growth and maximizing social welfare.

One consideration is the political acceptability of shifting costs traditionally funded through city-wide tax obligations to benefiting communities. By supporting the MDP with ambitious densification targets, Calgarians have already expressed an interest in moving toward an efficient built form. Transitioning toward a more user-pay financing system (provided overall taxes do not increase, all things being equal) will help them achieve this goal. A phase-in approach to shifting the tax burden will help homeowners to gradually absorb the incremental increase and adjust their home, work and commuting decisions accordingly. Council adopted a similar approach in its decision to consolidate the business tax and the non-residential property tax in 2011.

*THIS PRICING APPROACH REDUCES
THE NEED FOR PLANNING
REGULATION IN MANAGING
GROWTH-RELATED COSTS, AS IT
IS ULTIMATELY MORE EFFECTIVE
AT MANAGING GROWTH AND
MAXIMIZING SOCIAL WELFARE.*

4.2.1 ECONOMIC POLICY RECOMMENDATIONS

CALGARY CITY COUNCIL AND MUNICIPAL DECISION-MAKERS SHOULD FOLLOW THESE RECOMMENDATIONS:

1. Adopt a marginal cost approach to development levies (as opposed to an average-cost approach) to ensure new development in each community pays the actual infrastructure costs incurred. This should apply to new and existing communities. This approach can be achieved through, for example, the use of catchment boundaries for water, sanitary, storm and transportation infrastructure (City of Calgary 2013:15). The City should seek to target this change in time for the 2015 development levy negotiation with the industry;
2. Calculate maintenance, operating and life cycle infrastructure costs associated with new growth (roads, recreation, police, fire, EMS) and assign these costs to benefiting residential units or communities (through various tools such as a special tax, a local improvement levy or differential residential tax rates)

using a marginal cost approach. This approach should also apply to utility fees. Accounting for the true cost of development enables Calgarians to make housing and occupancy choices that minimize their costs and reduce or eliminate the tax-supported infrastructure costs that would accrue to the City;

3. Reduce the use of planning policies to regulate density in favour of the total construction, land and infrastructure cost approach to managing growth. This will lead to a more efficient, market-based approach to growth management and will better enable Calgarians to make informed housing choice and occupancy decisions based on total costs, and it will reduce overall costs to the City;
4. Adopt different prices for transit use based on distance travelled, zones and peak use as opposed to the current flat-fee structure. This approach will help ensure that consumers pay based on the marginal cost of providing the service, and it will reduce incentives for overuse; and
5. Phase in any tax burden shifts over five to 10 years to ensure Calgarians have time to adjust their work, home and commuting decisions accordingly.

ECONOMIC POLICY RECOMMENDATIONS

LESS AMBITIOUS REFORM ↓ MORE AMBITIOUS REFORM	POLICY	CURRENT STATUS	DESCRIPTION	BENEFIT
	Adopt a marginal cost approach to development levies in existing and new communities	City negotiates development levies based on average cost	Marginal cost pricing is efficient. Better directs growth based on cost	Ensures new development in each community pays the actual infrastructure costs incurred (as opposed to more-expensive developments being subsidized by lower cost developments)
	Calculate and assign infrastructure operating and life cycle costs to communities and households	Funded out of the general tax base	Primary principle is that beneficiaries of a service pay the cost. Avoids structural infrastructure deficits	Helps citizens make more-informed decisions about housing costs and choice based on the true cost of growth. Reduces or eliminates tax-supported infrastructure costs associated with growth
	Phase in any tax burden shifts over five to 10 years	N/A	Ensures stability for citizens and the City in terms of understanding tax obligations and revenue expectations	Ensures Calgarians have time to adjust their work, home and commuting decisions in the event their costs increase
	Adopt different prices for transit use based on distance travelled, zones and peak use	Applies a current flat-fee structure	Primary principle is that beneficiaries of a service pay the cost. Avoids over-consumption and use	Differential pricing helps ensure consumers pay based on the marginal cost of providing the service and reduces incentives for overuse.
	Reduce the use of planning policies to regulate density in favour of the total construction, land and infrastructure cost approach	Uses planning policy to regulate density in order to reduce growth costs	Municipal planning policies that mandate higher densities unnecessarily increase housing costs and reduce the total economic welfare of Calgarians	Accounting for the true cost of development enables Calgarians to make housing and occupancy choices that minimize their own costs and reduce or eliminate the tax-supported infrastructure costs that would accrue to the City.



NOTES

1. *The Overton Window is a public policy communication device used to show a range of policy options and their current political acceptability. It allows research institutes to express a wide range of ideas while being respectful of political reality. The spectrum displays policy ideas with increasing reform ambition while the “window” shows positions that are currently used or contemplated.*
2. *The CMHC approach is more reliable, as it is based on direct cost comparisons by built form type. The Plan It Calgary approach is based on costs of dispersed versus more-compact development in Calgary. This paper assumes that the dispersed infrastructure costs are associated with single-family development, while the compact form of development is associated with condo and townhome development.*

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